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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,511	10/30/2003	Gurtej S. Sandhu	MIO 0092 VA/40509.271	7666

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EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/697,511

Applicant(s)

SANDHU, GURTEJ S.

Examiner

Jeffrie R. Lund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 18 is rejected under 35 U.S.C. 102(e) as being anticipated by Hwang et al, 6,634,314 B2.

Hwang et al teaches a first gas port 308a to provide a flow of an input gas over the surface of a workpiece, a second gas port 308b to provide a direct flow of a precursor gas, a third gas port 308c, d adapted to flow a purge gas (Ar) to prevent the input and precursor gases from mixing, an RF source which forms a plasma used to generate reactive species i.e. a radiation beam, and a pair of evacuation ports 306.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 4, 6-13, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al, US Patent 6,200,389 B1, in view of Askary et al, US

Patent 4,774,416

Miller et al teaches a CVD apparatus for depositing material on a workpiece that includes: gas dispenser unit 160 containing a plurality of input gas and precursor injecting ports 105 separated by inert gas purge ports 106 for supplying purge gases to separate the input and precursor ports 105; evacuation ports 107 connected to a vacuum pumps via line 159 for evacuating the purge gas; mixing chambers 142; and a chuck 120 and transition stage 216 that includes heating and cooling means and sensors. (Figure 19)

Miller et al differs from the present invention in that Miller et al does not teach a source having optics, which converge a beam in the flow of the input gas to dissociate the input gas into a reactive species.

Askary et al teaches deposition source that includes a laser 66 with optics to expand a cross sectional dimension of the beam 64 such that the beam convergence into a wide scanning beam to dissociate gas 38 into reactive species. (Figure 1, column 5 lines 5-36)

The motivation for adding the laser of Askary et al to the apparatus of Miller et al is to provide a means for dissociating the input gas into a reactive species as taught by Askary et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the laser of Askary et al to the apparatus of Miller et al as taught by Askary et al.

5. Claims 5 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable

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over Miller et al, US Patent 6,200,389 B1, and Askary et al, US Patent 4,774,416, as applied to claims 1, 3, 4, 6-13, 17 and 18 above, and further in view of Elliott et al, US Patent 5,669,979.

Miller et al and Askary et al differ from the present invention in that they do not teach that the laser is a UV laser, a controller, monitor, and beam dump.

Elliott et al teaches an apparatus for chemically treating a surface of a workpiece that includes: a UV laser source 420; a controller 442; a monitor 520 for monitoring the completion of the treatment; and a beam dump 462. (Entire document, specifically, figures 11, 15 and 16)

The motivation for making the laser of Miller et al and Askary et al a UV laser is to provide a specific type of laser as required by Miller et al and Askary et al but only generically described. The motivation for adding a controller and monitor of Elliott et al to the apparatus of Miller et al and Askary et al is to monitor the process and control the apparatus of Miller et al and Askary et al. The motivation for adding the beam dump of Elliott et al to the apparatus of Miller et al and Askary et al is to trap any reflected energy from the laser as taught by Elliott et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an UV laser, and add the controller, monitor, and beam dump in the apparatus of Miller et al and Askary et al as taught by Elliott et al.

6. Claims 2 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al, US Patent 6,200,389 B1, and Askary et al, US Patent 4,774,416, as applied to claims 1, 3, 4, 6-13, 17 and 18 above, and further in view of Nakayama et al, US

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Patent 4,924,807.

Miller et al and Askary et al differ from the present invention in that they do not teach a fourth gas port adapted to provide a transmission gas to the reaction chamber.

Nakayama et al teaches supplying a transmission gas Q through a port. (Entire document, specifically, figures 5-8)

The motivation for supplying a transmission gas through a port to the apparatus of Miller et al and Askary et al is to control the flow of the input gas and to concentrate the input gas near the workpiece and to prevent contamination of inside of the window caused by the deposition of reaction products on the inside of the window as taught by Nakayama et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to supply a transmission gas to the apparatus of Miller et al and Askary et al as taught by Nakayama et al.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elliott et al, US Patent 5,669,979 in view of Sakuma et al, US Patent 5,270,247 and Nachshon, US Patent 5,114,834.

Elliott et al teaches an apparatus for chemically treating a surface of a workpiece that includes: a input gas supply; a dispenser unit including a nozzle 434 for supplying a gas in a laminar flow over a workpiece 414; a UV laser source 420 with optics 428 to form a wide scanning beam 416 and converging the beam of UV radiation through window 430 and into the flow of the input gas to dissociate the input gas into a high flux of reactive gas species 418 that reacts with the surface of the workpiece to chemically

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treat the workpiece; a transition stage 440 that moves the workpiece under the dispenser unit and beam; a vacuum pump 444 for exhausting the processing chamber 472; a mixing chamber 524; a controller 442; a monitor 520 for monitoring the completion of the treatment; and a beam dump 462. The finite distance is less than a few mean-free-path lengths of the generated reactive gas species. The dispenser unit and beam can be one of a plurality of dispenser units and beams. (Entire document, specifically, figures 11, 15 and 16)

Elliott et al differs from the present invention in that Elliott et al does not teach a second gas port for injecting a precursor gas onto the surface of the workpiece, a third gas port for purge gas, a pair of evacuation ports, or that the light beam is focused on the gas source to be dissociated by the radiation beam into point of use generated reactive species.

Sakuma et al teaches a gas dispenser unit 5 containing a first, second, and third injection ports 6 for supplying an input gas, a precursor gas, and a purge gas, which separate the input gas and precursor gas; and a pair of evacuation ports 4, 7. (Figures 1 and 15)

Nachshon teaches using a radiation source 16 to dissociate reactive species, which react with the surface of the workpiece (column 4 lines 58-64).

The motivation for replacing the gas supply system of Elliott et al with the gas supply system of Sakuma et al is to enable the apparatus of Elliott et al to deposit material using an ALE process as taught by Sakuma et al.

The motivation for adjusting the focus of the radiation beam of Elliott et al is to

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enable the radiation beam to dissociate the input gas to form a reactive species.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the gas supply system of Elliott et al with the gas supply system of Sakuma et al and use the radiation source of Elliott et al to form reactive species as taught by Nachshon.

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elliott et al, US Patent 5,669,979, Sakuma et al, US Patent 5,270,247 and Nachshon, US Patent 5,114,834 as applied to claim 18 above, and further in view of Nakayama et al, US Patent 4,924,807.

Elliott et al, Sakuma et al, and Nachshon differ from the present invention in that they do not teach a fourth gas port adapted to provide a transmission gas to the reaction chamber.

Nakayama et al teaches supplying a transmission gas Q through a port. (Entire document, specifically, figures 5-8)

The motivation for supplying a transmission gas through a port to the apparatus of Elliott et al, Sakuma et al, and Nachshon is to control the flow of the input gas and to concentrate the input gas near the workpiece and to prevent contamination of inside of the window caused by the deposition of reaction products on the inside of the window as taught by Nakayama et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to supply a transmission gas to the apparatus of Elliott et al, Sakuma et al, and Nachshon as taught by Nakayama et al.

Response to Amendment

9. The declaration under 37 CFR 1.132 filed July 19, 2005 is sufficient to overcome the rejection of claims 1-19 based upon Sandhu et al, US Patent Publication Application 2003/0102008.

Response to Arguments

10. Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art teaches the technological background of the invention.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
10/15/05